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ABSTRACT

The paper suggests the application of a research and development (R and D) process in an ongoing project at the National Technical Institute for the Deaf. Four phases/stages of the process are discussed: research, development, implementation, and maintenance. It is pointed out that the objective of the project has been to train normal hearing peers to tutor and take notes for deaf college students enrolled in regular college classes. Results of the tutoring/notetaking project are seen to suggest that the four phase process can enhance the probability of bringing about innovation through R and D efforts. Stressed is the importance of increasing "user" involvement within each stage of the process. (SB)

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FACILITATING CHANGE THROUGH A SIMPLIFIED R & D PROCESS

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NTID's principle goal in doing research is to influence the education, training and career placement of deaf citizens through systematic examination of issues related to deafness. As one part of NTID's total research effort, the Department of Research and Development conducts descriptive and experimental research. Research findings are used in the development of programs and materials in the areas of learning and instruction, personal and social growth, and career development of deaf students. This document was developed in the course of an agreement with the U.S. Department of Health, Education and Welfare.

Facilitating Change Through A Simplified R & D Process

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Facilitating Change Through A Simplified R & D Process

Research findings are seldom put into practice and there are undoubtedly numerous reasons for this. Bell (1975) suggests that one of the most important factors is the failure of R & D personnel to involve program users in the early stages of the research process. He further points out that educational researchers have often chosen inappropriate topics and areas of inquiry rather than focusing on the most urgent and pressing needs of students in the classroom and the decision makers who must determine the types of educational programs those students receive. The conclusions that Bell (1975) makes would suggest that there is a need for a new R & D process - a process that would allow researchers to communicate more effectively with both users and administrators (or funders) - a process that would facilitate the extension of research findings into actual practice. This paper will suggest an R & D process which has demonstrated its utility in addressing the issues described by Bell. Following the description of the process itself, its utility will be examined by describing its application in an ongoing project at the National Technical Institute for the Deaf.

Description of the Process

The process suggested in this paper is by intent not complicated. It consists of four primary phases. These four phases represent the broad sequence of activities necessary for advancing the embryo of an idea into the end goal of actual practice. The four stages are: 1) Research, 2) Development, 3) Implementation, and 4) Maintenance.

Evaluation is not listed as a separate stage since it occurs in all stages. Figure 1 depicts the four stages and the relative percentages of involvement of R & D personnel and the users for whom the program is being produced.

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insert Figure 1 about here
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The absolute values of the percentages are not important in that this will change as a function of the project and personnel involved. What is important is that the users are involved in all four phases. Their involvement should ensure that: 1) the end product will be relevant to the needs of the intended audience, 2) the content will be valid, 3) users will view the program as "theirs" and hence, be more willing to implement it.

Within each of the four phases are a series of subordinate activities. In this paper we will not attempt to elaborate on those steps except to say that the phases and associated activities are not mutually exclusive. Research activities may be conducted during the Development Phase, development activities may be carried out during the Implementation Phase and of course, evaluation is carried out in all stages. The category labels simply indicate the relative emphasis of the different types of activities. In other words, the Research Phase's primary focus is research, the Development Phase's, development, and so on.

Using the Process

During the past year the Department of Research and Development at the National Technical Institute for the Deaf (NTID) has been testing the utility of this process. One project that has been conducted using the process as a guide is the tutoring/notetaking (T/N) project. A detailed description of the project has been reported elsewhere (Osguthorpe, 1976). In the past, two options were available at NTID for providing tutoring and notetaking services:

Option 1: Professionals (master's degree level of training) serving as both tutors and notetakers.

Option 2: Professionals serving as tutors and student volunteers as notetakers.

The first option became prohibitive from a cost perspective as the institute increased its enrollment from 89 to approximately 900 students. The second option resulted in notes of varying quality and decreased contact between the professionals and course instructors. The T/N project was initiated to provide an alternative that would maintain quality at a reduced cost. The objective of the project has been to train normal-hearing peers to tutor and take notes for deaf college students enrolled in regular college classes.

Before describing the application of the R & D process to this project, it is important to identify the "users". As is the case with most educational programs, the users are composed of several different groups.

In this project four distinct groups of "users" were identified. The professionals were considered as the primary group of users in the project because it had been their responsibility to provide tutoring and notetaking services and because the plan called for them to assume the managerial responsibilities for the program once it was developed. Another group of "users" would be the T/N's who would be trained to provide the service. The T/N's were undergraduate hearing students at the Rochester Institute of Technology (RIT). Deaf students must also be considered as users in this project. Finally, administrators who authorize the expenditures for the program are in a sense users. It should be clear at this point that it would be impractical to involve all users in the R&D process. What is important is to ensure that each group of users is involved and feels a sense of participation in the project. Since some groups of users are usually more central to the success of a program than other groups, it is assumed that these groups should be more heavily involved in the R & D process. This systematic involvement of user groups in research and development activities is in direct response to Bell's (1975) injunction that researchers avoid the common practice of designing programs and conducting studies in complete isolation.

In order to illustrate the effects of the R & D process a summary will be given of the T/N project as it has progressed through the Research Development, Implementation and Maintenance phases.

The Research Phase

In the Research Phase data should be gathered to document an identified need. This data should also provide insight into the most appropriate strategies for meeting the need. As strategies and/or programs are suggested, a thorough review of related research and existing programs should be completed. In Figure 2 sample tasks are suggested for each of the phases, including the Research Phase. These tasks are provided for illustrative purposes and should neither be considered as a complete list nor as mandatory for all R & D projects. In the case of

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insert figure 2 about here

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the T/N project the need for new support options became apparent as student numbers increased and the number of professional staff remained constant. This identified need was further assessed by interviewing professional tutors and notetakers. As the need became clear, alternative strategies were proposed. The strategy viewed as having the most potential for meeting the established need was based largely on the use of paraprofessionals as tutors and notetakers. Experts in the area of paraprofessional tutoring were invited to NTID in a consultant role and existing literature in notetaking (especially for deaf students) was reviewed. Following these initial steps, it was determined that a training program should be developed for the purpose of ensuring that paraprofessionals (normal-hearing peers) would have the necessary skills in order to provide effective tutoring and notetaking services for deaf

students. As Figure 1 suggests, program users were not heavily involved in this phase of the project. They did have input into the needs assessment but were not responsible for reviewing research or writing proposals. These tasks were conducted by the project manager. It is important to note, however, that the users were fully aware of the T/N project and that it was in the Research Phase. This knowledge enabled users, administrators, and the T/N project manager to communicate more effectively concerning the specific roles and responsibilities of each group. Users knew that their role would become increasingly important as the project moved from research to development. Administrators' expectations and funding projections were aided because they could predict progress and specific task completion with greater accuracy.

The Development Phase

The Development Phase can best be differentiated from the Research Phase by considering the outcomes of each phase. In the Research Phase, the outcome can be characterized as accumulated data. Some of this data is collected specifically for the project and some is reviewed from previous research. The form that final write-ups take is completely dependent on project needs, but the primary outcome remains as data. If instruments are constructed, they are also designed for the collection of data that will lead to program development. The instrument is not considered an end in itself. Tasks for the Development Phase are described in Figure 2. In each task, it can be seen that the expected outcome is some type of intervention program. While data collection is essential in the Development Phase, it is not the primary purpose of the

phase. The primary purpose is to produce an effective instructional program that will meet the needs identified in the Research Phase.

As the T/N project moved from research to development, users gradually assumed an increasingly important role. Professional tutors and notetakers were asked for suggestions concerning the development of a training guide for T/N's. Meetings were held with groups of professionals as well as separate meetings between the project manager and individual tutors. As the T/N guide was written, professionals were asked for critical feedback and suggestions.

Once the T/N guide was complete, the training program was designed. Again, professionals and other faculty played a key role in the planning and conducting of the training program. After T/N's had completed the training program, the project manager continued in a supervisory role meeting with T/N's weekly and suggesting methods for improving their tutoring and notetaking skills. In essence, this constituted the field test of the T/N concept which was still in the development stage. Professionals were involved in the field test, usually as scheduling coordinators. They knew how many T/N's were serving, what students they were supporting, and the courses they were covering. It should be noted, however, that professionals had little direct contact with T/N's during the development phase.

At the close of the first quarter of the T/N field test, formative data were collected from each of the three populations involved: 1) T/N's themselves, 2) students, and 3) faculty (see Figure 2). The input obtained from these three groups was used in making revisions in the T/N

manual and training procedures (see Scriven, 1969). It is important to note at this point that the T/N project remained an "experimental" program throughout the Development Phase. The primary purpose of the project during this phase was to test the feasibility of the T/N concept and refine the program as opposed to providing the needed service.

Implementation Phase

During the Implementation Phase the project is still experimental but the nature of the experiment has shifted. In the Development Phase the experiment is to find a procedure that will work in controlled circumstances. In the Implementation Phase that procedure which worked in a controlled environment is now tested in the "real world" with all the users for whom it was designed. The project director's role is one of evaluation & revision, not one of direction.

At the writing of this paper, the T/N program is nearing the end of the Implementation Phase. The T/N manual has undergone extensive revision based on the formative data, several professionals in different colleges have assumed full management responsibility, and the purpose of the program is gradually shifting from experimental in nature to that of providing service to students. This shift in purpose is important for two reasons. First, it is a signal that the program is being conducted as it was originally envisioned and therefore must be carefully evaluated. The evaluation should be summative in nature - comparing the effects of the program with some other alternative. It would have been inappropriate to gather this type of data earlier when the program was in embryo because the data might have been misleading. For example, if

the data were positive, it could be attributed to the artificial management scheme and monitoring procedures that change during the Implementation Phase.

Summative data, then, should be gathered when the program is in transition from an experimental study to an institute-wide system that has been assimilated by users and has, in effect, become "theirs." The T/N program is now near the end of that transitory phase. Managers have begun to think of the program as their own. They are testing its effectiveness with a variety of students in a variety of courses. They continue to provide helpful input concerning changes and augmentations that would improve the program's utility.

Maintenance Phase

If the summative data collected in the Implementation Phase indicate that a program is meeting the needs for which it was developed, the program will enter the Maintenance Phase. In the Maintenance Phase R & D personnel assume a less important role in the program but continue to monitor its effects and make recommendations to program managers. If it is determined that the program is no longer meeting the intended needs, or if the experimental environment changes and the original needs dissipate, R & D personnel may conclude that the program should be discontinued. Additional R & D maintenance tasks are described in Figure 2.

After summative data have been collected on the T/N program, a decision will be made concerning the program's future. If the data show

that the program is meeting the needs originally identified, the program will enter the Maintenance Phase. In the Maintenance Phase, users will assume all of the responsibilities associated with the management and training aspects of the program. R & D personnel will assume a less visible role, but will still be involved in the data collection needed to ensure that consistently higher quality support services are being delivered. The mechanisms for collecting such data will largely be integral to the program at this point - rather than auxiliary to it. This data might best be called system monitoring data (see Figure 2). By gathering this type of information, it is anticipated that program improvements will continue as long as the program is administered.

Conclusions

The results of the T/N project would suggest that the four phase process can enhance the probability of bringing about innovation through research and development efforts. That is not to say that the process precludes the occurrence of difficulties. It should be noted that the T/N project did encounter some resistance. It should also be noted, however, that the problems that developed in the T/N project could usually be attributed to poor communication between the R & D staff and the users. Part of this communication consisted of role clarification. It was found that when R & D staff and administrators took time to clarify roles using the model, users and researchers had congruent expectations.

There is no question that when R & D personnel use the four phase model, projects are completed at a slower rate. Involving users and administrators in the decision making processes takes time. The trade-off is the greater assurance that R & D findings will actually result in improved practice. In the opinion of the authors, the trade-off is worth it.

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Facilitating Change Through A Simplified R & D Process (EVA)

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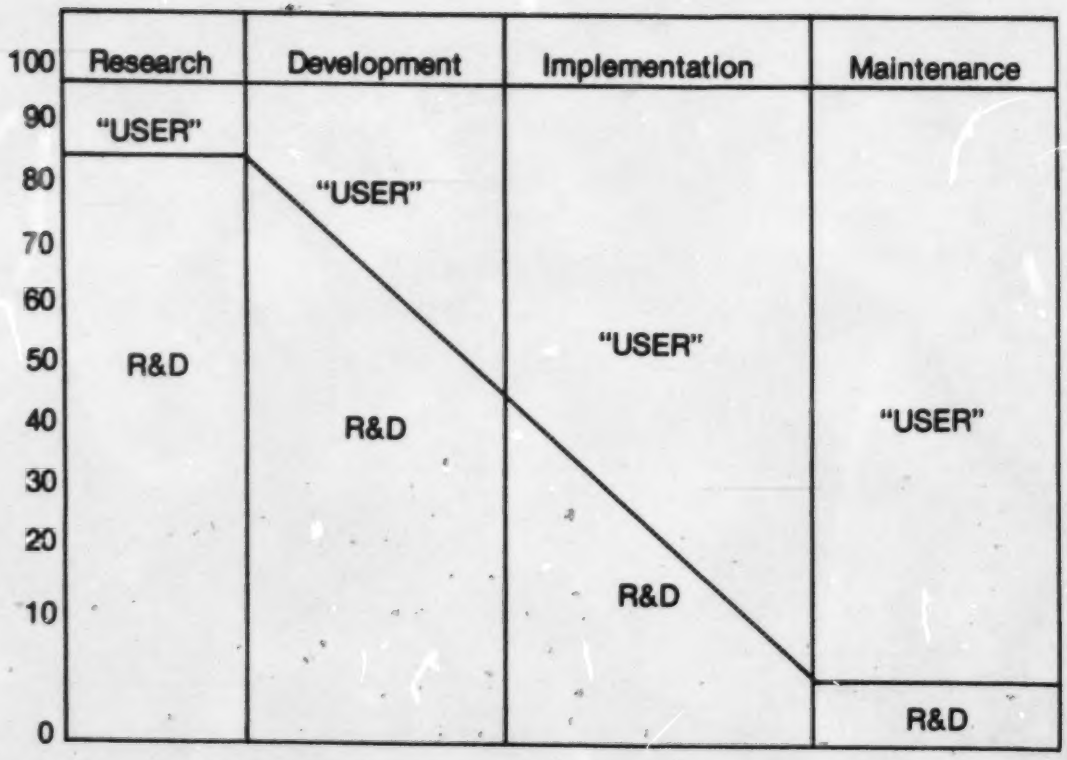
A four phase process is described which is designed to aid R & D personnel in their attempt to institute change in educational practice. The four phases include: 1) Research, 2) Development, 3) Implementation and 4) Maintenance. Emphasis is placed on increasing "user" involvement within each stage of the process. Results are given of an R & D project which used the four phase process as a guide. The results show that the process can be useful to users and administrators, as well as R & D personnel.

Figure Captions

Figure 1. A four phase process showing the percentage of involvement of users and R & D personnel.

Figure 2. Sample tasks emphasizing the role of evaluation in each of the four phases of the R & D process.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Research
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	Research	Development	Implementation	Maintenance
Sample Tasks	• Review existing research literature • Review available training programs • Review existing measurement instruments • Design measurement instruments • Gather descriptive data • Design and conduct experimental studies	• Determine program objectives • Identify and organize content • Involve content experts • Select instructional strategies • Identify appropriate delivery system(s) • Discuss content, strategy and delivery system proposals with users • Design format specifications for materials to be developed • Produce instructional package (manuals media supports, etc.) • Design management system • Field test with users program segments as they are completed • Field test entire program with users on limited scale	• Explain program objectives to total user population • Explain users' role(s) in program implementation • Recruit additional personnel if necessary • Train program managers, proctors or tutors, etc. • Schedule inservice training • Schedule student/program contact • Determine pay scale • Project future funding • Perform cost analyses • Refine management system • Refine program	• Review personnel needs • Expand or reduce program if necessary • Review cost analyses • Make minor program revisions
TYPES OF EVALUATIVE DATA	NEEDS ASSESSMENT	FORMATIVE EVALUATION	SUMMATIVE EVALUATION	SYSTEM MONITORING
	Should a program be developed? If so, what needs should it address?	How can the program be improved?	What is the worth of the program? Should the program be continued?	Is the program continuing to meet the original objectives?